Turning the Curve

Small City Pavement Preservation

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Maintaining small city streets comes with a host of unique problems. Chief among these are scant resources, small asphalt quantities, long haul distances, and lack of standards at original construction. In the recent past, project scopes for small city preservation projects were based on how much money was available instead of achieving the greatest efficiency.

Washington has 163 small cities ranging from 50 people up to 5,000, the small city population limit defined by the state. In 2005, the Washington State Legislature allocated new funding and directed the state Transportation Improvement Board (TIB) to initiate a worst-first pavement recovery program. The TIB responded by creating the Small City Preservation Program beginning in 2006.

Little reliable data existed on the condition of the more than 1,600 miles of paved streets that spread across a state of 71,000 square miles. Previous efforts to collect pavement data called for small cities to send ratings to the state, but the results were spotty and unreliable. We know anecdotally the downward spiral of small city street conditions persisted for more than 50 years. Even though each town averages only about 10 miles, small city street systems represent hundreds of millions of dollars in public investment.

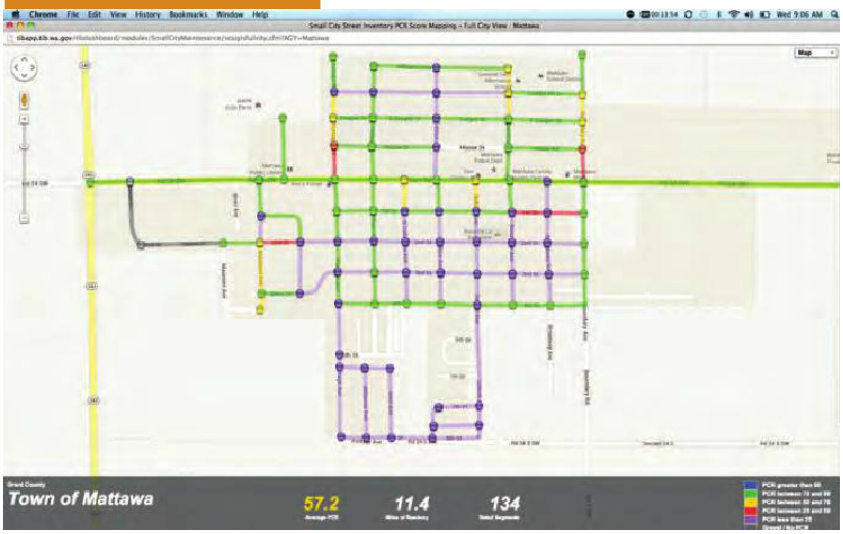
Many towns made heroic efforts to keep streets intact. The City of Mattawa (pop. 4495) bought pavement tailings from a nearby WSDOT paver and compacted them into a ragtag surface. The City of Republic (pop. 1085) stuffed crushed rock into deep potholes hoping it would be better than nothing. The City of Palouse (pop. 1020) did regular $15,000 seal coats, the most they could afford. Some towns did less or nothing at all. Decades passed while small cities were losing the street preservation battle and the average small city street condition continued to drop well below TIB standards. Mattawa weighed in with the lowest average pavement condition in the state – scoring 33 on a 100-point scale of pavement condition ratings (PCR).

Small budgets no match for infrastructure maintenance

Small city budgets do not match up with the cost of maintaining infrastructure. In Washington State, cities receive a portion of the state gas tax – an important dedicated revenue source. However, gas tax distributions equal about $20 per capita, so a town of 1,400 people, the average small city population, would bring in a little more than $28,000 annually.

About a decade ago, former Bridgeport Mayor Steve Jenkins (now serving as Douglas County Commissioner) told the legislature that his town would need to save up its share of the gas tax for ten years to do one substantial paving project, which was a good estimate. Bridgeport (pop. 2415) received about $30,000 in annual gas tax distributions, which would only cover 10 percent of a typical TIB small city paver. Rehabilitating Bridgeport's pavement condition – or any other small city's pavement – would have required close to ten of these projects. The TIB concluded that small city preservation was not happening because, all good intentions aside, the system was set up for failure.

TIB Dashboard



Developing the pavement preservation program and performance targets

In 2006 TIB started the Small City Preservation Program, tackling both data collection and analytics. It took TIB engineers two years of fieldwork, logging the pavement condition of every small city street, to correct the data problem. TIB engineers now rate the pavement condition of all small cities on a minimum four-year rotation. The small city maintenance database in the TIB dashboard (*www.tib.wa.gov/tibdashboard*) tracks and maps all street segments.

Within the TIB Dashboard, each small city was mapped and color-coded illustrating the pavement condition data collected by TIB engineers. A performance scale emerged and a first level objective was set to bring all small cities up to an average

pavement condition of 70 PCR. This PCR threshold was chosen because it represents a key breakpoint where less expensive preventative maintenance can be used to extend the life of street surfaces.

The City of Mattawa started with the collectively worst pavement in the state at just 33 PCR. Once mapped according to the TIB performance scale, Mattawa and 23 other towns had such low average pavement condition ratings their indicators in the TIB Dashboard turned red. Shortly thereafter, the Red Towns Initiative began, a performance-based budgeting approach to accelerate recovery.

The City of Kittitas (pop. 1450) was another community with ailing streets – in fact many of the city's streets were gravel. An innovative partnership using the Operating Engineers Training School set out to pave the town's system. Previously, the school created a training environment for engineers by resurfacing its own parking lot. Now the school contributes expertise, equipment, and student labor while TIB covers the cost of materials and commercial hauling to pave gravel streets in Kittitas, a real-world training laboratory. These students, who will work on future commercial paving projects, leave an enduring improvement in Kittitas.

Challenges of project delivery

Once the extent of the problem was identified, the next challenge was how to go about fixing it. Ten demonstration projects were chosen, allowing TIB to study the challenges associated with project delivery. Two facts were clear: 1) small cities are spread across the state and often far from asphalt sources; 2) these cities historically buy low quantities of asphalt. Long haul distances combined with small quantities resulted in high unit costs – typically 40 percent above what state highway pavers were experiencing.

Studying the results from the ten demonstration projects produced several important findings.

- *Maintenance programs cannot operate like traditional grant programs.* Timing and economy of scale are critical price drivers. In order to stretch valuable resources, TIB needed to have the flexibility to invest in preservation projects that made the most sense at the right time.

- *Economies of scale in asphalt purchasing must be leveraged.* Many small city paving projects buy approximately 500 tons of asphalt. Yet TIB found much better unit prices when purchasing 50,000 tons or more. Only Washington State Department of Transportation (WSDOT) pavers on long stretches of state highway were able to achieve such scale economies near rural communities.

- *Partnerships with other entities in the area are essential.* Mobilization costs and haul distances add significantly to small, often rural projects. County road crews routinely seal and pave near small cities, but spending rules precluded them from going past city limits.

Based on demonstration program results, TIB changed several policies to ensure efficiency and seamless operations. The TIB and WSDOT now have a master paving agreement that allows paving contracts to bundle small city work with much larger state highway pavers. The practice reduces the cost of paving in small cities by 40 percent.

The TIB now provides funding for county crews and private sector contractors to roll right past the city limits. The result is improved continuity and small cities are able to take advantage of skilled staff as well as equipment and materials that are already onsite. The TIB collaboration with counties produces a unit price for seal coat about 60 percent lower than a town could access on its own.

TIB Small City Preservation Program

Portfolio Data (2013)

	Statewide	Mattawa	Kittitas
Total Funded SCPP Projects	242	6	5
Total SCPP Expenditures	$20,225,000	$1,350,000	$460,000
TIB Funding from other programs[1]		$400,000	$2,420,000
Total TIB Funding		$1,750,000	$2,880,000
Average PCR Score	73.7	57.2	75.7[2]

[1]/Other TIB programs include Small City Arterial Program and Small City Sidewalk Program

[2]/Kittitas pavement ratings exclude gravel streets

Achieving performance targets of the preservation program

The TIB met its initial performance objective to put small cities on a track toward improving pavement condition. The second level objective calls for achieving an average pavement condition of 70 PCR for all towns.

In addition, TIB intends to eliminate the Red Towns problem, those very low condition cities. Today there are only ten small cities with the Red Town label, opposed to the 23 when the program started. The TIB expects to complete the Red Towns objective in summer 2013 by finally bringing the lowest small cities up to about 70 PCR. Once the statewide average for small city pavements reaches 70 PCR, TIB will set a new performance target to bring remaining below average streets up to par.

Vision and execution prove to be the biggest challenges in improving the cost performance of small city preservation projects. Engineers must closely monitor projects over a large area to see and seize the best paving opportunities. The TIB incorporates opportunities for economy of scale into its project selection process – cities that actively seek partnerships get priority. The TIB is implementing its largest paving program yet in summer 2013 with more than 30 projects. Ultimately, efficient productivity will assure Washington has one of the best-maintained small city street systems in the country.